

## E7 Project 82 - Efficiency Improvements in Power Plants

**Location:** Aqaba and Amman

**Type:** Enhancement of efficient combustion

**Size:** 750 MW total

**Funding:** Total: US\$1,000,000

Private: US\$1,000,000

**Objective:** To improve efficiency and reduce greenhouse gas (GHG) emissions.

**Duration:** 1997–2000

**Scale:** Urban

### Summary

This privately financed project provided technical assistance and financing to Jordan's Central Electricity Generating Company (CEGCO), an independent company that emerged from the privatization of the former public utility, to improve thermal power plant efficiency and reduce GHG emissions. Efficiency savings of 1.5 to 6% are expected to reduce carbon dioxide (CO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>) emissions significantly. CEGCO has indicated that due to the success of the project, they hope to repeat the work on additional generating units.

### In-Country Principles That Attracted Nondonor Financing

- Capacity building and informed decision making
- Institution building and access to justice and enforcement of laws

A key factor that helped attract private-sector interest was the increased awareness, knowledge, and skills of sector



professionals made possible through such activities as dissemination of best practices and participation in international forums and workshops.

A comprehensive energy law that meets global norms and standards characterized by basic policies and priorities was also important. Jordan has adopted a national environmental strategy that prioritizes environmental issues, with sustainable energy as one of the priorities in the energy sector. The aim is to reduce GHG emissions and decrease the use of expensive fossil fuels in a sustainable manner.

### Financing

Total project investment by E7 was approximately US\$1,000,000 and roughly 2 man-years of in-kind E7 effort. E7 is a group of nine of the world's largest electricity companies, working together to promote efficient generation and use of electricity and to protect the global environment. CEGCO contributed in-kind labor in amounts equivalent to those of the E7 participants, and an unspecified amount for monitoring and testing equipment. Phase I assessment and testing cost roughly US\$195,000, and Phase II implementation costs were roughly US\$760,000.

### The Project

The project was undertaken at three units at two sites operated by CEGCO — the Aqaba Thermal Power Station (TPS) in southern Jordan and the Hussein TPS in Zarqa, near Amman.

The project included two phases. The first phase consisted of boiler combustion optimization, boiler/turbine heat rate and efficiency testing, a water chemistry workshop, and training to improve plant efficiency. This phase also included the establishment of an energy-efficiency performance test team to help maintain the improvements in performance achieved with this project, and to apply the knowledge and test equipment to other units. In this phase, E7 provided CEGCO with the equipment needed for the testing of the units.

The second phase of the project consisted of improvements to air preheaters, the installation of a performance monitoring system and upgrades to instrumentation, as well as the installation of emissions measurement equipment to improve combustion instrumentation.

## Technical Data

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Technologies used to monitor emissions and improve efficiency included combustion performance testing equipment and software, air preheater seals, boiler tube washes, air heater upgrades, and instrumentation and emission monitoring upgrades.

## Performance Data

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Phase I work improved unit performance and resulted in annual emissions savings of 20,000 Mg of CO<sub>2</sub> and 500 Mg of SO<sub>2</sub>. Phase I improvements in the first year of operations are expected to reduce CO<sub>2</sub> emissions by 30,178 Mg and SO<sub>2</sub> emissions by 744 Mg. Over a five-year period, it is estimated that the project will achieve savings of roughly 172,000 Mg of CO<sub>2</sub> and 4,100 Mg of SO<sub>2</sub>.

## Participants and Roles

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E7 participants included Ontario Power Generation (OPG), which managed the project; Electricite de France (EDF), which supported training and a computer monitoring system; Ente Nazionale Energia Elettrica (ENEL) of Italy, which supported combustion testing; Hydro Quebec, which contributed additional funding; and Rheinisch-Westfälische



Elektrizitätswerke (RWE) of Germany, which supported air heater improvements. CECGO was the host utility.

## Partner Contact

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